

REMARKS

The applicant requests reconsideration in view of the amendment and the following remarks. Support for amended claim 4 can be found in the specification at page 4, lines 14 and 15, and lines 25 to 27. The applicant has amended claim 24 in order to overcome the 35 USC 112 second paragraph, rejection. Support for newly added claim 25 can be found in claim 24.

Claims 4 and 20-24 are rejected under 35 USC 103(a), over Hoffert (US 2,660,598) (“Hoffert”) in view of Hidaka (US 6,294,633) (“Hidaka”) for the reasons outlined in the previous Office Action. Claims 21, 22, and 24 are rejected under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The applicant respectfully traverses these rejections.

35 USC 103(a) Rejection

The difference between the reactor which is claimed in claim 4 and the one which is disclosed in Hoffert is that the reactor according to claim 4 of the present application comprises a fixed-bed catalyst whose interior tubes through which a coolant can be passed run, wherein cooling is carried out by means of boiling water such that the difference between outlet temperature and inlet temperature of the reactor is less than 35⁰C. In contrast to the claimed reactor, in Hoffert, a reactor is disclosed, in which the reaction zone contains a heat exchanger 13 extending through the space occupied by the catalyst and supplied with a suitable cooling fluid via inlet leg 14 and outlet pipe 15, see column 4, lines 31 to 35 of Hoffert. According to Hoffert an improved heat transfer is obtained by the use of fixed or static bed catalytic operations under the advantages prevailing in “fluid” systems, see col. 1, lines 1-7 of Hoffert. This is not the case in the system according to claim 4 of the present application.

According to page 2, line 22 through, page 3, line 1 of the applicant's specification, the operating life of the zeolithe catalyst is better, the smaller the difference between outlet temperature and inlet temperature of the reactor, preferably less than 6000. Excessively high output temperature or "hot-spots" in the reactor lead to decrease in the proportion of DMA in the product mixture and increase in the proportion of undesired TMA. A more preferred difference between outlet temperature and inlet temperature of less than 35°C is obtained in the reactor according to claim 4 by carrying out cooling by means of boiling water cooling. Boiling water cooling has the advantage that large amounts of energy can be transferred from the reaction zones, having the result that the outlet temperature is less than 35W higher than the inlet temperature of the reactor. This specific kind of cooling, boiling water cooling is the key of the present reactor, making it possible to obtain alkyl amines prepared from C₁₋₄-alkanols with ammonia in the gas phase having high amounts of the mono- and di-substituted amine, and having very small amounts of the tri-substituted amine.

Hoffert does not indicate the specific way of cooling resulting in the very small difference between inlet- and outlet temperature of the reactor of the applicant's claim 4. In Hoffert, it is only taught that the reaction zone contains a heat exchanger extending through the space occupied by the catalyst, see above. The applicant believes that this teaching does not suggest the specific way of cooling, boiling water cooling, which is conducted in the reactor according to claim 4 of the present application. In addition, Hoffert discloses that the arrangement of the so-called "fluid" system makes it possible that a fixed-bed catalyst system is operated with no more than negligible variation in temperature throughout the reaction zone, see column 3, lines 52 to 56 of Hoffert. The wording "no more than negligible variation in

temperature” does not give any hint on how big this variation may be for the production of alkyl amines according to the present application. Because Hoffert does not specifically disclose the preparation of alkyl amines, Hoffert cannot point in the direction of the specific arrangement which is claimed in claim 4.

In addition, the very general teaching of Hoffert that the heat exchanger shall be present in the reactor cannot point in the direction of the very specific way of cooling as claimed in claim 4 of the present application.

Hidaka's European equivalent is cited at pages 2 and 7 of the specification. Further, Hidaka does not suggest the very specific reactor according to claim 4 of the present application, because Hidaka does not teach that so-called “hot-spots” shall be avoided, in order to increase the operating life of the zeolithe catalyst. In addition, Hidaka does not suggest the difference between outlet temperature and inlet temperature of the reactor shall be less than 35⁰C. Because Hidaka does not disclose any reactors at all, Hidaka cannot point in the direction of the very specific way of cooling, as it is conducted in the reactor according to claim 4 of the present application.

Therefore, from the applicant's point of view, the cited documents do not suggest the very specific reactor according to claim 4 of the present application. A person of ordinary skill in the art does not find any hints in the direction of the specific problems which are solved by the present invention, and he or she does not find any solutions for these problems. Therefore, claim 4 of the present application is non-obvious in light of the cited documents. For the above reasons, this rejection should be withdrawn.

112 Rejection

Claims 21, 22, and 24 are rejected under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The applicant has canceled claims 21 and 22. The applicant has amended claim 24 and believes that claim 24 as amended is in compliance 35 USC 112, second paragraph. For the above reasons, this rejection should be withdrawn.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 03-2775, under Order No. 13156-00011-US from which the undersigned is authorized to draw.

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Respectfully submitted,

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